REMARKS

Applicants thank the Examiner for the thorough examination given the present application.

Status of the Claims

Claims 1-5 and 7 are pending in the above-identified application. In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

Priority under 35 U.S.C. § 119

The Examiner has not acknowledged Applicants' claim for foreign priority under 35 U.S.C. § 119 and receipt of the certified priority document. Acknowledgment thereof by the Examiner in the next Office Action is respectfully requested.

Drawings

Since no objection has been received, Applicants assume that the drawings are acceptable and that no further action is necessary. Confirmation thereof in the next Office Action is respectfully requested.

Issues under 35 U.S.C. § 103(a)

1) Claims 1-5 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukuoka et al. '268 (US 5,210,268).

2) Claims 1-5 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tojo et al. '210 (US 6,262,210) in view of Fukuoka et al. '268.

Applicants respectfully traverse. Reconsideration and withdrawal of these rejections are respectfully requested based on the following considerations.

Legal Standard for Determining Prima Facie Obviousness

MPEP 2141 sets forth the guidelines in determining obviousness. First, the Examiner has to take into account the factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), which has provided the controlling framework for an obviousness analysis. The four *Graham* factors are:

(a) determining the scope and content of the prior art;

(b) ascertaining the differences between the prior art and the claims in issue;

(c) resolving the level of ordinary skill in the pertinent art; and

(d) evaluating any evidence of secondary considerations.

Graham v. John Deere, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

Second, the Examiner has to provide some rationale for determining obviousness. MPEP 2143 sets forth some rationales that were established in the recent decision of *KSR International Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). Exemplary rationales that may support a conclusion of obviousness include:

(a) combining prior art elements according to known methods to yield predictable results;

(b) simple substitution of one known element for another to obtain predictable results;

(c) use of known technique to improve similar devices (methods, or products) in the same way;

(d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(e) "obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success

(f) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;

(g) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

As the MPEP directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. *See* MPEP 2143.03.

Distinctions over the Cited References

The Examiner's reason for rejection on pages 2-4 of the outstanding Office Action is summarized by the following. Neither Fukuoka et al. '268 nor Tojo et al. '210 disclose that an aromatic carbonate produced by a conventional transesterification process contains the impurity referred to as aromatic carbonate ether (b) in claim 1 of the present application. However, Fukuoka et al. '268 teach that impurities are contained in the aromatic carbonate and can be removed therefrom by distillation. Tojo et al. '210 further teach that the removal of impurities from the aromatic carbonate prevents the discoloration of an aromatic polycarbonate produced from the aromatic carbonate. Therefore, a person having ordinary skill in the art at the time the present invention was made would have been motivated to combine the teaching of Fukuoka et al. '268 with Tojo et al. '210 to develop a process as claimed in the present application. Applicants respectfully traverse.

As described in the present specification, the present invention is directed to a process for producing an aromatic carbonate, which can be advantageously used as a raw material for producing a transesterification aromatic polycarbonate. In their studies, the present inventors have unexpectedly found that a specific aromatic carbonate ether is contained in an aromatic carbonate produced by a conventional transesterification process and that, by the removal of the aromatic carbonate ether, an aromatic carbonate which is advantageously used as a raw material for producing a transesterification aromatic polycarbonate can be obtained. The process of the present invention is characterized in that the process involves a step for separating the aromatic carbonate ether (b).

The aromatic carbonate obtained by the process of the present invention exhibits high polymerization reactivity when used as a raw material for a transesterification aromatic polycarbonate. This means that the aromatic polycarbonate obtained by the use of the aromatic carbonate has a high molecular weight. The use of the aromatic carbonate is also advantageous in that the aromatic polycarbonate can be produced at a high polymerization rate.

With respect to the above-mentioned advantage of the use of the aromatic carbonate obtained by the process of the present invention, the present specification explains as follows:

> [0013] An object of the present invention is to provide a process for producing a high purity aromatic carbonate which exhibits advantageously high reactivity when used as a raw material for a transesterification aromatic polycarbonate (emphasis added; page 13, line 25 to page 14, line 4).
>
> [0086] In one preferred embodiment of the present invention, a diaryl carbonate obtained by the process of the present invention is used for producing an aromatic polycarbonate by transesterification. When the diaryl carbonate obtained by the process of the present invention is used for producing an aromatic polycarbonate by transesterification, it becomes possible to perform the polymerization reaction at a high polymerization rate. Further, a high quality aromatic polycarbonate which is colorless can be obtained by the transesterification of an aromatic dihydroxy compound with the diaryl carbonate obtained by the process of the present invention (emphasis added; page 50, lines 7-18).

The production of an aromatic polycarbonate having a high molecular weight at a high polymerization rate can for the first time be achieved by the use of the aromatic carbonate obtained by the process of the present invention. In order to substantiate this, Mr. TOJO, one of the present inventors, has made observations with reference to Examples 5-8 and Comparative Example 3 of the present application. The method and results are as described in Exhibit 1 accompanying the TOJO Declaration.

Exhibit 1 of the enclosed Declaration of Mr. Tojo shows the results of Examples 5-8 and Comparative Example 3. In each of Examples 5-8 of the present specification, an aromatic polycarbonate having a number average molecular weight as high as 9,500 or more is produced at a polymerization rate as high as 3,167 per hour or more by virtue of the use of an aromatic carbonate, which is obtained by the process of the present invention and which has an aromatic carbonate ether (b) content as low as 5 ppm by weight or less. In contrast, in Comparative Example 3 of the present specification, an aromatic polycarbonate having a number average molecular weight as low as 7,500 is produced at a polymerization rate as low as 2,500 per hour due to the use of an aromatic carbonate, which is obtained by a conventional process and which has an aromatic carbonate ether (b) content as high as 67 ppm by weight. Therefore, the production of an aromatic polycarbonate having a high molecular weight at a high

polymerization rate can for the first time be achieved by the use of the aromatic carbonate obtained by the process of the present invention.

In connection with the molecular weight of an aromatic polycarbonate, the higher the molecular weight of an aromatic polycarbonate, the higher the mechanical and thermal properties of the aromatic polycarbonate. Therefore, the aromatic polycarbonate obtained in the present invention exhibits excellent mechanical and thermal properties.

As support for the fact that the higher the molecular weight of an aromatic polycarbonate, the higher the mechanical and thermal properties of the aromatic polycarbonate, Applicants submit, as Exhibit 2, the following document:

ENCYCLOPEDIA OF CHEMICAL PROCESSING, VOLUME 4 (edited by Sunggyu Lee, Taylor & Francis Group, published in 2006), pages 2277-2278.

Exhibit 2 describes the structures and properties of polycarbonates, especially those of aromatic polycarbonates. For easy reference, the description of page 2278, right column, lines 11-14 of Exhibit 2 is reproduced below:

> In general, mechanical and thermal properties such as impact resistance and softening point increase with increasing molecular weight, as does melt viscosity (and thus resistance to flow).

Neither Fukuoka et al. '268 nor Tojo et al. '210 teach or suggest that the production of an aromatic polycarbonate having a high molecular weight at a high polymerization rate can be achieved by the use of the aromatic carbonate obtained by the process of the present invention, which has a sufficiently reduced content of the aromatic carbonate ether (b). On this point, a detailed explanation is given below with reference to the disclosure of Fukuoka et al. '268 and Tojo et al. '210.

According to the Examiner, Tojo et al. '210 teach that the high reactivity of an aromatic carbonate can be achieved by the removal of impurities. More specifically, at page 11, lines 6-9 of the outstanding Office Action, the Examiner states as follows:

> Tojo et al. teach the result to be expected upon removal of impurities: that aromatic carbonates with high levels of purity and better reactivity can be obtained (See column 1, lines 54-56 and column 6, lines 53-56). (emphasis added)

Applicants respectfully traverse this statement. As explained below, the cited portions of Tojo et al. '210 provided by the Examiner do not teach or suggest that an aromatic carbonate having a sufficiently reduced content of a specific impurity as obtained by the process of the present invention exhibits a high reactivity when used as a raw material for a transesterification aromatic polycarbonate.

For easy reference, the Examiner's cited portions of Tojo et al. '210 are reproduced below:

> "the desired aromatic carbonates having high purity can be produced stably for a prolonged period of time" (col. 1, lines 54-56 of Tojo et al. '210)

> "disadvantageous phenomena, such as the accumulation of the high boiling point substance (A) in the reaction system which causes the discoloration of an ultimate aromatic polycarbonate (which is produced from an aromatic carbonate), can be prevented" (col. 6, lines 53-57 of Tojo et al. '210)

The first above-cited portion of Tojo et al. '210 is concerned with a stable and long period production of an aromatic carbonate by the use of a specific process. That is, the cited portion refers to an advantageous production of an aromatic carbonate (which is a monomer) by the use of a specific process, differing from an advantageous production of an aromatic polycarbonate by the use of an excellent aromatic carbonate. The cited portion does not have any teaching or suggestion about an advantageous production of an aromatic polycarbonate, let alone a high polymerization rate production of an aromatic polycarbonate having a high molecular weight as achieved by the use of an aromatic carbonate having a sufficiently reduced content of a specific impurity.

On the other hand, the second above-cited portion of Tojo et al. '210 only describes the prevention of the discoloration of an aromatic polycarbonate. The cited portion does not teach or suggest the high reactivity of the aromatic carbonate from which the aromatic polycarbonate is produced.

Therefore, Tojo et al. '210 do not teach or suggest that the production of an aromatic polycarbonate having a high molecular weight at a high polymerization rate can be achieved by the use of the aromatic carbonate obtained by the process of the present invention.

With respect to Fukuoka et al. '268, the Examiner's attention is drawn to the following description of Fukuoka et al. '268:

> Accordingly, it is an object of the present invention to provide a novel process for continuously producing an aromatic carbonate efficiently at a high reaction rate and with a high selectivity by using a continuous multistage distillation column as a reaction column (emphasis added; col. 5, lines 49-53).

The "high reaction rate" referred to in the above-cited portion of Fukuoka et al. '268 is concerned with a production of an aromatic carbonate by the use of a continuous multistage distillation column. That is, the cited portion of Fukuoka et al. '268 refers to an advantageous production of an aromatic carbonate (which is a monomer) by the use of a specific process, differing from an advantageous production of an aromatic polycarbonate by the use of an excellent aromatic carbonate. The cited portion of Fukuoka et al. '268 does not have any teaching or suggestion about an advantageous production of an aromatic polycarbonate, let alone a high polymerization rate production of an aromatic polycarbonate having a high molecular weight as achieved by the use of an aromatic carbonate having a sufficiently reduced content of a specific impurity.

To establish a *prima facie* case of obviousness of a claimed invention, all of the claim limitations must be disclosed by the cited references. As discussed above, Fukuoka et al. '268 and Tojo et al. '210, either alone or in combination, fail to disclose all of the claim limitations of independent claim 1, and those claims dependent thereon. Accordingly, the combination of references does not render the present invention obvious.

Furthermore, the cited references or the knowledge in the art provide no reason or rationale that would allow one of ordinary skill in the art to arrive at the present invention as claimed. Therefore, a *prima facie* case of obviousness has not been established, and withdrawal of the outstanding rejections is respectfully requested. Any contentions of the USPTO to the contrary must be reconsidered at present.

Double Patenting

Claims 1-5 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of Fukuoka et al. '268 (pages 11-12 of the outstanding Office Action). Applicants respectfully traverse.

As discussed above, Fukuoka et al. '268 do not disclose each and every aspect of claims 1-5. As such, Applicants respectfully request that this rejection be withdrawn.

Conclusion

All of the stated grounds of rejection have been properly traversed. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

Should there by an outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad M. Rink, Registration No. 58,258, at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

Dated: MAR 17 2010

Respectfully submitted,

By _____

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Attachments: 37 CFR § 1.132 Declaration of Masahiro Tojo; and
ENCYCLOPEDIA OF CHEMICAL PROCESSING, VOLUME 4 (edited by Sunggyu Lee, Taylor & Francis Group, published in 2006), pages 2277-2278.